

DRUG TREATMENT

There is a wide range of effective drugs to treat people with cardiovascular disease. They have improved people's quality of life and lowered death rates. A brief overview of the use of prescription medicines in Australia is presented here. The data shown refer to use in the community only; medicines given in hospital are not included.

Drug use is measured in defined daily dose per 1,000 population per day (DDD/1,000/day). This is based on the assumed average dose per day of a drug used for its main indication in adults. The DDD enables valid comparisons between drugs independent of differences in price, preparation and quantity per prescription.

BLOOD PRESSURE LOWERING DRUGS

Although drugs in this class are grouped as 'blood pressure lowering', they also have other important and useful effects and are given to treat various conditions, not just high blood pressure. As the indication for which the drug is prescribed is not recorded, it is not possible to determine drug use for specific conditions or purposes. It would be incorrect to think that these data show the use of drugs to lower blood pressure.

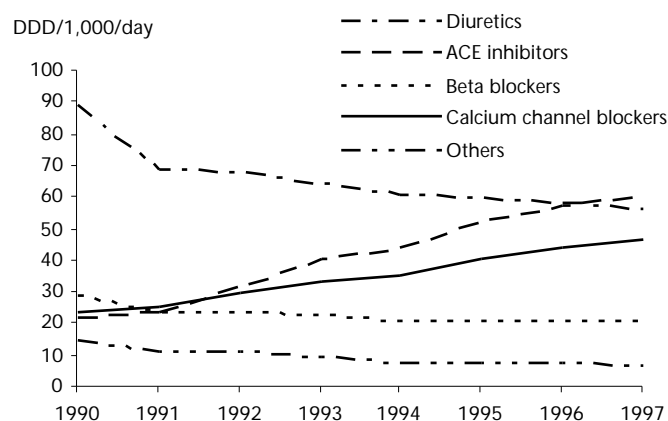
DID YOU *know*?

- 40.6 million drug prescriptions for cardiovascular drugs were dispensed in 1997. This represents a fifth of all prescriptions.
- Frusemide, a diuretic, was the second most widely used drug in Australia in 1997. Enalapril, simvastatin, amlodipine and felodipine were also among the top ten.
- Simvastatin, a cholesterol lowering drug, was the top drug by cost to the government, amounting to \$185 million in 1997. Also ranked in the top ten were enalapril, amlodipine, captopril and pravastatin.
- About 1.6 million Australians were on treatment for high blood pressure in 1995.

Diuretics

Diuretics are effective in reducing blood pressure. This reduces the occurrence of strokes and heart disease. Diuretics are also helpful for people with heart failure.

Though diuretics are still very popular, their prescription is falling in favour of more modern drugs such as ACE inhibitors and calcium channel blockers. Frusemide was the most commonly dispensed diuretic in 1997 (22.7 DDD/1,000/day).



Note: DDD = defined daily dose.

Source: DHFS 1998.

Community use of blood pressure lowering drugs, 1990-97

Beta blockers

Beta blockers are used to treat patients with high blood pressure and have other important uses. In people with angina or history of heart attack, beta blockers can reduce pain and deaths, and prevent further heart attacks. Through their lowering of blood pressure, these drugs prevent strokes and heart attacks. Usage levels have remained unchanged in the 1990s. Atenolol was the most widely prescribed beta blocker in 1997 (9.7 DDD/1,000/day).

Calcium channel blockers

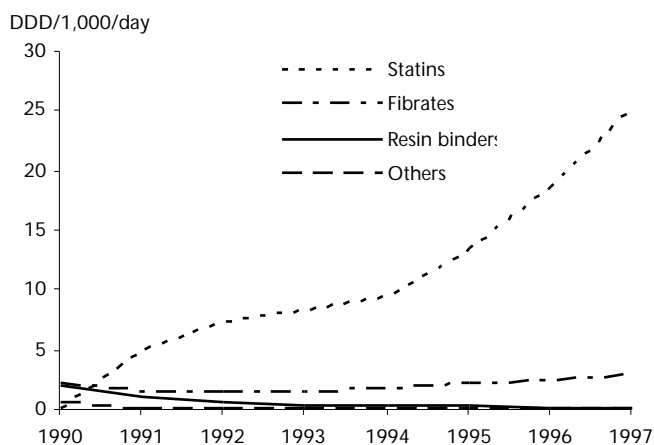
Calcium channel blockers are effective in reducing blood pressure and angina. So far, only one drug in this class (verapamil) has been shown to prevent further heart attacks and deaths in people with a previous heart attack. The use of calcium channel blockers has risen steadily in recent years. Amlodipine and felodipine were the most commonly dispensed calcium channel blockers in 1997 (14.8 and 11.7 DDD/1,000/day, respectively).

Angiotensin converting enzyme (ACE) inhibitors

ACE inhibitors are used widely to treat people with high blood pressure or heart failure. These drugs limit the progressive enlargement of the heart after a heart attack and relieve heart failure symptoms. If given early during a heart attack, they can reduce deaths. They have become increasingly popular in the 1990s. Enalapril (22.0 DDD/1,000/day) is the most used ACE inhibitor, followed by captopril (9.9 DDD/1,000/day) and lisinopril (9.4 DDD/1,000/day).

LIPID LOWERING DRUGS

Lipid lowering drugs are effective in preventing heart attacks and reducing coronary heart disease deaths. Statins, resin binders, nicotinic acid, fibrates and probucol all reduce blood LDL (low density lipoprotein) cholesterol to varying degrees, statins being the most effective agents. Fibrates, nicotinic acid and fish oil lower blood triglycerides. The use of statins has increased dramatically since 1994 when their value was established conclusively. Simvastatin is the most widely prescribed lipid lowering agent (20.5 DDD/1,000/day), followed by pravastatin and fluvastatin (3.3 and 1.4 DDD/1,000/day, respectively).



Note: DDD = defined daily dose.

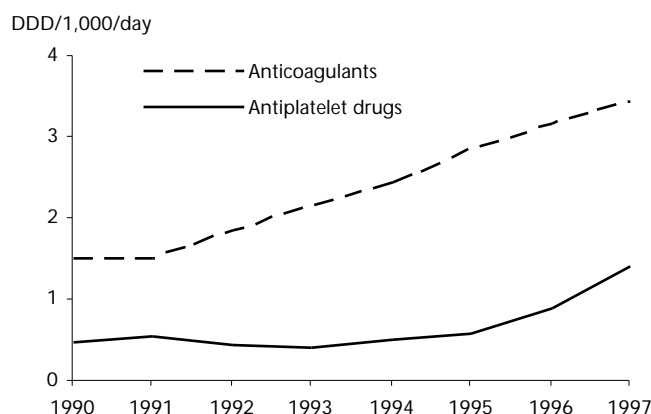
Source: DHFS 1998.

Community use of lipid lowering drugs, 1990-1997

ANTITHROMBOTIC DRUGS

Thrombolytic drugs

Thrombolytic drugs dissolve blood clots. These drugs are given only in hospital, under close supervision. They are useful in patients suffering a heart attack, where a clot blocks blood supply to part of the heart. They are also effective in people having a stroke caused by a clot impeding blood flow to part of the brain (ischaemic stroke). Thrombolytics are used less in peripheral vascular disease. For best results, the drugs must be given early in the heart attack or stroke. Among 35-64-year-olds, an estimated 42% of people suffering a heart attack were treated with thrombolytics in 1991 to 1993, a 5% increase per year since 1985. As these drugs are given only in hospital, it is not valid to talk about their community use.



Note: DDD = defined daily dose.

Source: DHFS 1998.

Community use of drugs to prevent or dissolve blood clots, 1990-97

Aspirin and other antiplatelet agents

Antiplatelet drugs interfere with the formation of blood clots that are made of platelets. Among these drugs are aspirin, ticlopidine and abciximab. If given during a heart attack, aspirin reduces the risk of death. Used long-term, it also reduces deaths and heart attacks among people with coronary heart disease. Given early during an ischaemic stroke (see page 44), aspirin reduces later similar strokes as well as deaths and disability. Antiplatelet agents used long-term in ischaemic stroke patients also prevent further strokes. The use of antiplatelet drugs, particularly aspirin, has risen in the past few years (aspirin 1.3 DDD/1,000/day in 1997, excluding that obtained over the counter, that is, without prescription).

Anticoagulants

These drugs prevent the formation of clots that could block blood vessels by interfering with the clotting process. Anticoagulants are given to certain patients with stroke, peripheral vascular disease or heart disease to lower their risk of subsequent disease. Warfarin and heparin are in this class of drugs. Their use has increased markedly in the 1990s (warfarin 3.3 DDD/1,000/day in 1997).

OTHER DRUGS

Nitrates

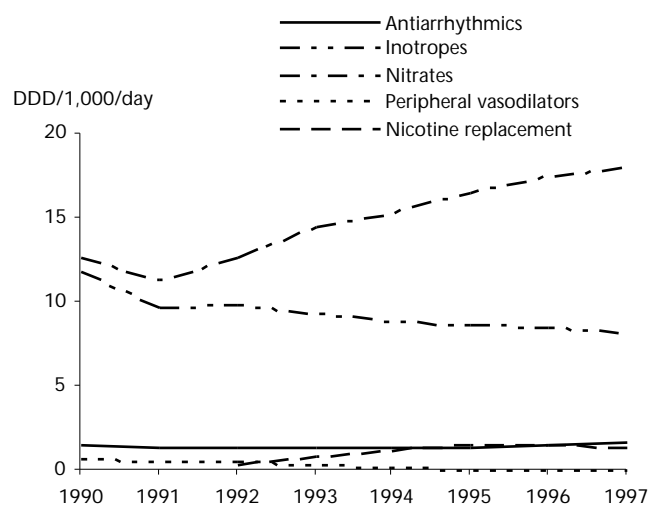
Nitrates relieve and prevent angina symptoms by dilating blood vessels. They are among the most commonly prescribed cardiovascular drugs. Their use has risen over the past 6 years (all nitrates 17.9 DDD/1,000/day in 1997).

Inotropes

Inotropes increase the force of contraction of the heart muscle. These drugs are useful in people with heart failure. There has been a slow decline in the prescription of these drugs since 1990 (all inotropes 8.1 DDD/1,000/day in 1997).

Antiarrhythmics

Antiarrhythmic drugs are given to restore the normal heart rhythm or prevent serious (life-threatening) abnormal heart rhythms (arrhythmias). Amiodarone is the most commonly dispensed drug in this class. The level of use of these drugs in the community has remained fairly constant during the 1990s (amiodarone 1.0 DDD/1,000/day in 1997).



Note: DDD = defined daily dose.

Source: DHFS 1998.

Community use of other drugs for cardiovascular disease, 1990-97

Antismoking agents

Nicotine, in the form of skin patches or chewing gum, is used as replacement therapy to help people give up smoking. Stopping tobacco smoking lowers the occurrence of coronary heart disease, stroke and peripheral vascular disease, and reduces progression of disease. The use of nicotine replacement therapy increased since 1992 but has stabilised in the past 3 years.

DRUG COSTS

The costs of cardiovascular drugs amounted to \$1,105 million, that is, 34% of all prescription drug costs in 1997. Government and patient costs are available only for drugs listed in the Pharmaceutical Benefits Scheme, so these figures underestimate the total cost of cardiovascular drugs.

The following table shows the cost of prescription drugs used in the community in Australia during 1997.

Prescription drugs used in the community in Australia, 1997

Drug	No. scripts (000) ^(a)	\$ (millions) ^(b)
Blood pressure lowering drugs		
ACE inhibitors	9,961.5	330.0
Calcium channel blockers	8,553.2	221.3
Beta blockers	5,111.2	55.2
Diuretics	3,482.2	39.7
Other	1,145.7	19.9
Total blood pressure lowering drugs	28,253.8	666.2
Lipid lowering drugs		
Statins	5,421.6	274.1
Fibrates	627.4	28.6
Resin binders	66.2	3.5
Other	32.9	0.7
Total lipid lowering drugs	6,148.1	306.9
Other drugs		
Nitrates	2,752.4	63.4
Nicotine (antismoking agent)	575.9	21.7
Antiarrhythmics	416.0	18.5
Inotropes	788.2	6.4
Peripheral vasodilators	9.0	0.1
Total other drugs	4,541.4	110.1
Antithrombotic drugs		
Anticoagulants	1,488.7	14.7
Antiplatelets	167.2	7.0 ^(c)
Total antithrombotic drugs	1,655.8	21.8
Total cardiovascular drugs	40,599.1	1,104.9

(a) Includes drugs subsidised under the Pharmaceutical Benefits and Repatriation Pharmaceutical Benefits Schemes and non-subsidised drugs.

(b) Includes government and patient costs for drugs listed in the Pharmaceutical Benefits Scheme only.

(c) This figure is likely to grossly underestimate the actual cost as over-the-counter aspirin is not included.

Source: DHFS 1998.

FURTHER INFORMATION

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Main data sources

Pharmaceutical Benefits Scheme and Repatriation Pharmaceutical Benefits Scheme (Health Insurance Commission).

Pharmacy Guild Survey.

References/further reading

1998 MIMS Annual. Twenty-second edition. MIMS Australia, June 1998.

Australian medicines handbook 1998. First edition. Adelaide: Australian Medicines Handbook Pty Ltd.

Commonwealth Department of Health and Family Services (DHFS) 1998. Australian statistics on medicines 1997. Canberra: AGPS.

Waters A-M, Armstrong T & Senes-Ferrari S 1998. Medical care of cardiovascular disease in Australia. Cardiovascular Disease Series No. 7. AIHW Cat. No. CVD 4. Canberra: AIHW.

CARDIOVASCULAR PROCEDURES

Cardiovascular disease is a major cause of illness and death in Australia. The most common forms of heart disease affecting Australians are coronary heart disease, acquired valve disease, conduction defects, congestive heart failure and congenital heart defects. Stroke and vascular disease also cause significant long-term suffering and disability. Medical services offer a range of procedures to diagnose and treat cardiovascular disease. A brief overview of their use in Australia is presented here.

PROCEDURES FOR HEART DISEASE

Coronary angiography

Coronary angiography gives a picture of the heart's arteries. It is used to diagnose coronary heart disease and is essential before either coronary artery bypass surgery or coronary angioplasty. In 1996–97, there were 68,335 coronary angiograms.

Coronary artery bypass grafts

Coronary artery bypass grafting (CABG) entails using blood vessel grafts to bypass blockages in the coronary arteries and restore adequate blood supply to the heart muscle. Usually the graft material comes from a vein in the patient's leg or a chest artery, or both. CABG is not a cure for coronary artery disease, and there is a risk of recurrent disease.

DID YOU *know*?

- During 1994 there were 19,409 heart surgery procedures performed in 37 units around Australia. The national rate of operations was 1,088 per million population, with a mortality rate of 2.8%.
- By far the most common heart operation was coronary artery bypass grafting (CABG).
- Most people undergoing procedures for heart, stroke and vascular diseases are over 54 years old.
- Hospital care of heart, stroke and vascular diseases cost \$1,657 million in 1993–94. In addition, medical and allied health professional services amounted to \$543 million.

Reoperations are uncommon within the first 5 years but become more frequent later. Although coronary angioplasty (see below) has replaced some CABG procedures, the techniques are complementary and the rate of CABG is still increasing.

There were 14,941 coronary bypass graft operations in 1994, with a mortality rate of 2.5%. Eight per cent of coronary artery bypass graft procedures were reoperations.

The national average rate for coronary artery bypass graft surgery was 837 per million population in 1994. The rate varied markedly across States, ranging from 707 per million population in Tasmania to 1,010 per million population in South Australia.

Coronary angioplasty

As with coronary artery bypass grafting, coronary angioplasty is used to restore adequate blood flow to blocked coronary arteries. It involves inserting a catheter with a balloon into a major artery via the skin. The catheter is threaded through the circulation back towards the heart and into the coronary arteries to the area of the vessel blockage. The balloon is then inflated against the plaque to create a wider passage for blood flow.

Coronary angioplasty avoids the major trauma of coronary artery bypass graft surgery because it does not require the opening of the patient's chest. However, the technique can be used to treat only certain types of coronary artery obstruction.

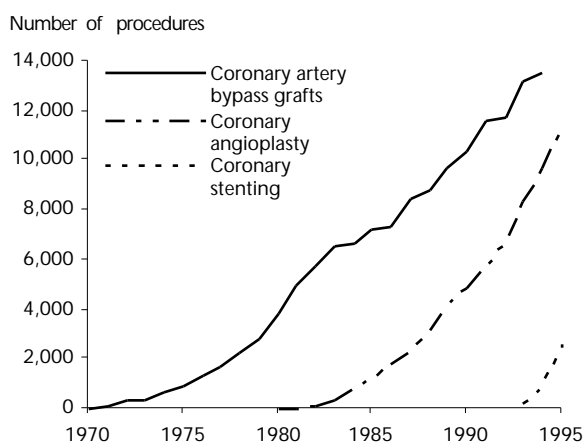
During 1995 there were 11,348 coronary angioplasty procedures performed in 39 units throughout Australia. This was a 17% increase in procedure numbers over the previous year. Twenty-one per cent of the procedures were repeats.

The average national rate in 1995 was 629 per million population. This varies widely across States, from 403 per million population in Queensland to 875 per million population in Western Australia.

Coronary stenting

Although initial coronary angioplasty success rates are high, there is a risk of early acute closure of the coronary artery and a high rate of reblockage. This led to the development of other catheter-based techniques. The most successful of these newer techniques is stenting and hence its use is increasing rapidly. Coronary stenting involves expanding metal mesh tubes within the artery to form a supporting structure which holds the artery open.

Stents were inserted in 30% of coronary angioplasty patients in 1995. This represents a 175% increase over their use in the previous year.



Sources: National Cardiac Surgery and Coronary Angioplasty Registers.

Trends in coronary revascularisation procedures, 1970–95

Heart transplants

There were 94 heart transplants and 4 combined heart-lung transplants done in 1997. The main reasons for heart transplant are coronary heart disease and cardiomyopathy.

Operations for congenital defects

Congenital conditions include abnormalities of the heart or heart valves, defects of the great vessels, such as the aorta and pulmonary artery, or combinations of defects. Most children with congenital defects are treated with surgery, usually in infancy or early childhood.

There were 1,520 operations for congenital heart defects in 1994. Septal defects (defects in the wall which separates the left and right chambers of the heart) were the main reasons for congenital heart surgery.

Surgery for heart valve defects

Valve surgery involves repairing or replacing the mitral, aortic, tricuspid or pulmonary valves. Valve disease may be age-related, a result of disease such as rheumatic fever, or congenital. Most valve procedures in Australia consist of replacing the damaged valve with a mechanical device, a pig device or a human graft. Reconstruction of the damaged valve by stitching techniques is less common. Simpler valve procedures can be undertaken with catheter-based techniques.

Heart valve defects accounted for 3,686 procedures in 1994. Surgery was most frequent for the aortic and mitral valves. Fifty-nine procedures were reoperations for mechanical valve failures and 130 procedures were reoperations for tissue valve failures.

Electrophysiological treatments

Electrophysiology surgery involves carefully removing or destroying sections of heart muscle tissue responsible for abnormal heart rhythms (arrhythmias) which can be serious or even life-threatening. There were 75 such operations in 1994.

Implantable cardiac defibrillators

Implantable cardiac defibrillators are effective in preventing sudden cardiac death in people at high risk of the life-threatening arrhythmia known as fibrillation. In 1996–97, there were 340 such devices implanted in Australia.

PROCEDURES FOR STROKE

CT brain scan

Computerised tomographic (CT) scan of the brain is used in acute stroke to distinguish between the major stroke types (blocked blood supply to the brain; bleeding within the brain or on its surface). This guides treatment. The test is also done to confirm a clinical diagnosis of stroke which may be difficult to make. During 1996–97 a total of 11,878 CT brain scans were performed for a stroke diagnosis.

Carotid endarterectomy

Carotid endarterectomy entails surgically removing plaque from the carotid arteries in the neck which supply blood to the brain. This reduces the risk of blockages in these arteries, which could lead to a stroke. Only about 10% of stroke patients are suitable candidates for this procedure. In 1996–97 there were 4,478 carotid endarterectomies in Australia.

Magnetic resonance imaging scan and ultrasound of carotid arteries

Magnetic resonance imaging (MRI) of the brain and ultrasound of the carotid arteries are non-invasive investigations done to help diagnose stroke or assess the risk of stroke. There are no national figures on the number of these procedures performed for stroke.

PROCEDURES FOR PERIPHERAL VASCULAR DISEASE

Amputation for peripheral vascular disease

In severe cases of peripheral vascular disease the reduced blood supply to the lower limbs results in an amputation. There were 635 amputations for peripheral vascular disease in 1996–97. People aged 65 and over accounted for 80% of them.

Surgery for abdominal aortic aneurysm

Abdominal aortic aneurysm is an abnormal widening of the aorta (the main artery leading from the heart) below the level of the renal arteries. They are life-threatening if they rupture so surgery is performed in severe cases. In 1996–97 there were 2,210 such operations in Australia. People aged 65 years and over, accounted for 80% of these procedures.

FURTHER INFORMATION

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Main data sources

National Hospital Morbidity Database (Australian Institute of Health and Welfare).

National Cardiac Surgery Register (Australian Institute of Health and Welfare and Heart Foundation of Australia).

National Coronary Angioplasty Register (Australian Institute of Health and Welfare and Heart Foundation of Australia).

References/further reading

Australian Institute of Health and Welfare (AIHW) 1998. Australian hospital statistics 1996–97. Health Services Series No. 11. AIHW Cat. No. HSE 5. Canberra: AIHW.

Senes-Ferrari S 1999. Coronary angioplasty in Australia 1995. Cardiovascular Disease Series No. 8. AIHW Cat. No. CVD 5. Canberra: AIHW.

Senes-Ferrari S 1999. Cardiac surgery in Australia 1994. Cardiovascular Disease Series No. 9. AIHW Cat. No. CVD 6. Canberra: AIHW.

Waters A-M, Armstrong T & Senes-Ferrari S 1998. Medical care of cardiovascular disease in Australia. Cardiovascular Disease Series No. 7. AIHW Cat. No. CVD 4. Canberra: AIHW.

